

# Operating Manual

## Tenter guider infeed KRS with digital controller DC 5501/5506 and actuator KR 47../51../52../56.. Guiding by an edge with manual sensor positioning

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### Component description:

Sensor	B
Actuator	D
Spreading device (optional)	G
Command devices	H
Digital interface (optional)	I
Electrical components	U
CAN bus, serial bus and setup editor (optional)	V
Spare parts lists	X
Parameter lists	Y
Diagrams	Z

## Explanation of symbols

→ = jobs to be performed

|| = important information and instructions

! = sections of the text due particular attention to assure the safe operation of the tender guider infeed.

## Operating manual structure

The E+L tender guider infeed operating manual consists of a general system description (A), the individual component descriptions (B, C, ... W), spare parts lists (X), parameter lists (Y) and diagrams (Z).

Follow the instructions in the operating manual. All important operating sequences are explained in it. Where necessary, reference is made to the individual component descriptions.

The block diagram contains a schematic of your system. It also lists the address settings for the digital devices.

|| See the parameter lists for explanations of the individual setup parameters. Procedure for checking/changing setup parameters can be found in section 4 "Setup editor".

## Type overview

The operating manual is applicable for tender guider infeeds KRS 47, KRS 49, KRS 51 KRS 52, KRS 55 and KRS 56.

# 1. Function

## 1.1 Purpose

Tender guider infeeds are designed to set the infeed rails to the actual position of the web, thus assuring that the web edges are taken up on the chain pins or clips correctly.

## 1.2 Design

There are four different E+L tender guider infeed models for various web speeds and performances. See also Technical data section.

On tender guider infeeds with a KR 47 actuator, the adjusting movement is transferred by a trapezoidal ball screw, with KR 51, KR 52 and KR 56 actuators by a rack.

|| Actuator KR 52 replaces actuator KR 51 in KRS 51. tender guider infeeds.

|| KR 52 actuators may only always be used or replaced in pairs.

|| Actuator KR 56 replaces actuator KR 51 in KRS 55. tender guider infeeds.

### 1.2.1 Tender guider infeed KRS 47

E+L tender guider infeed **KRS 47** consists of:

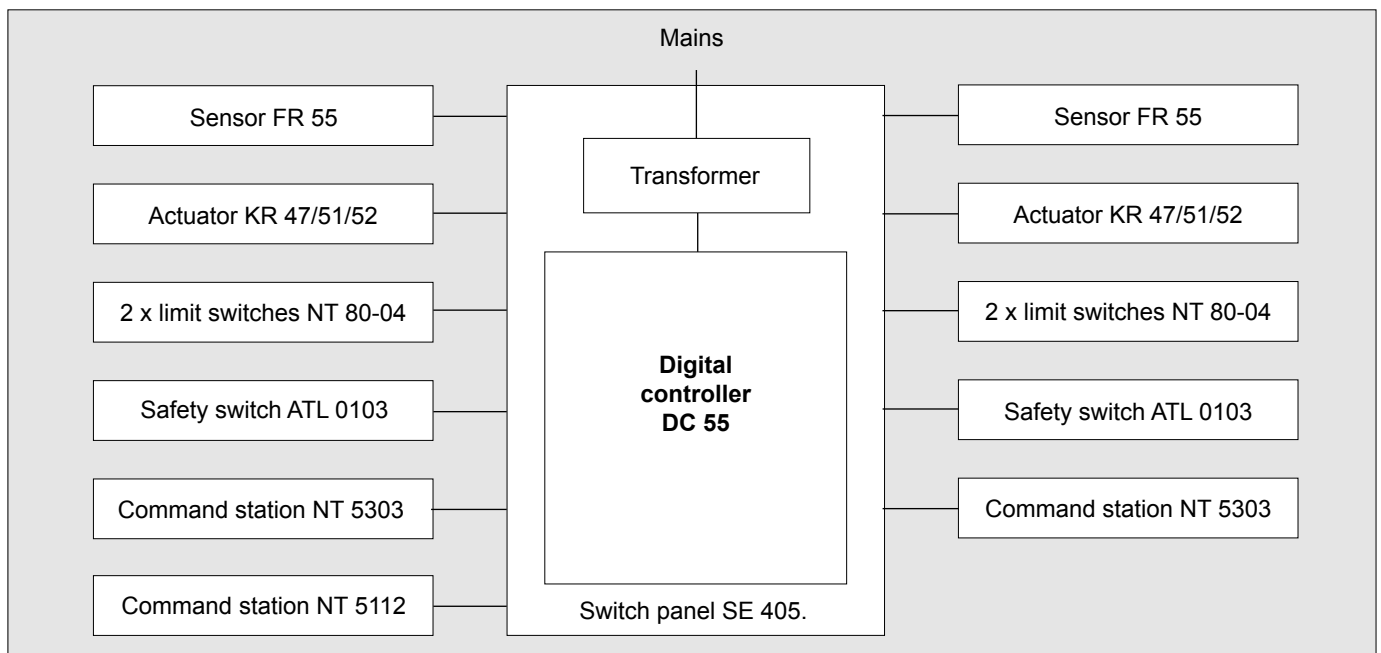
- two FR 55 sensors
- two **KR 47** actuators
- two sets of NT 80-04 rail limit switches
- two ATL 0103 safety switches
- **one** digital controller DC 55 with transformer
- command stations NT 5112 (1x) and NT 5303 (2x)

### 1.2.2 Tender guider infeed KRS 52 (51)

E+L tender guider infeed **KRS 52 (KRS 51)** consists of:

- two FR 55 sensors
- two **KR 52 (KR 51)** actuators
- two racks
- two sets of NT 80-04 rail limit switches
- two ATL 0103 safety switches
- **one** digital controller DC 55 with transformer
- command stations NT 5112 (1x) and NT 5303 (2x)

Design: tender guider infeed KRS 47,  
KRS 51 and KRS 52



### 1.2.3 Tender guider infeed KRS 49

E+L tender guider infeed **KRS 49** consists of:

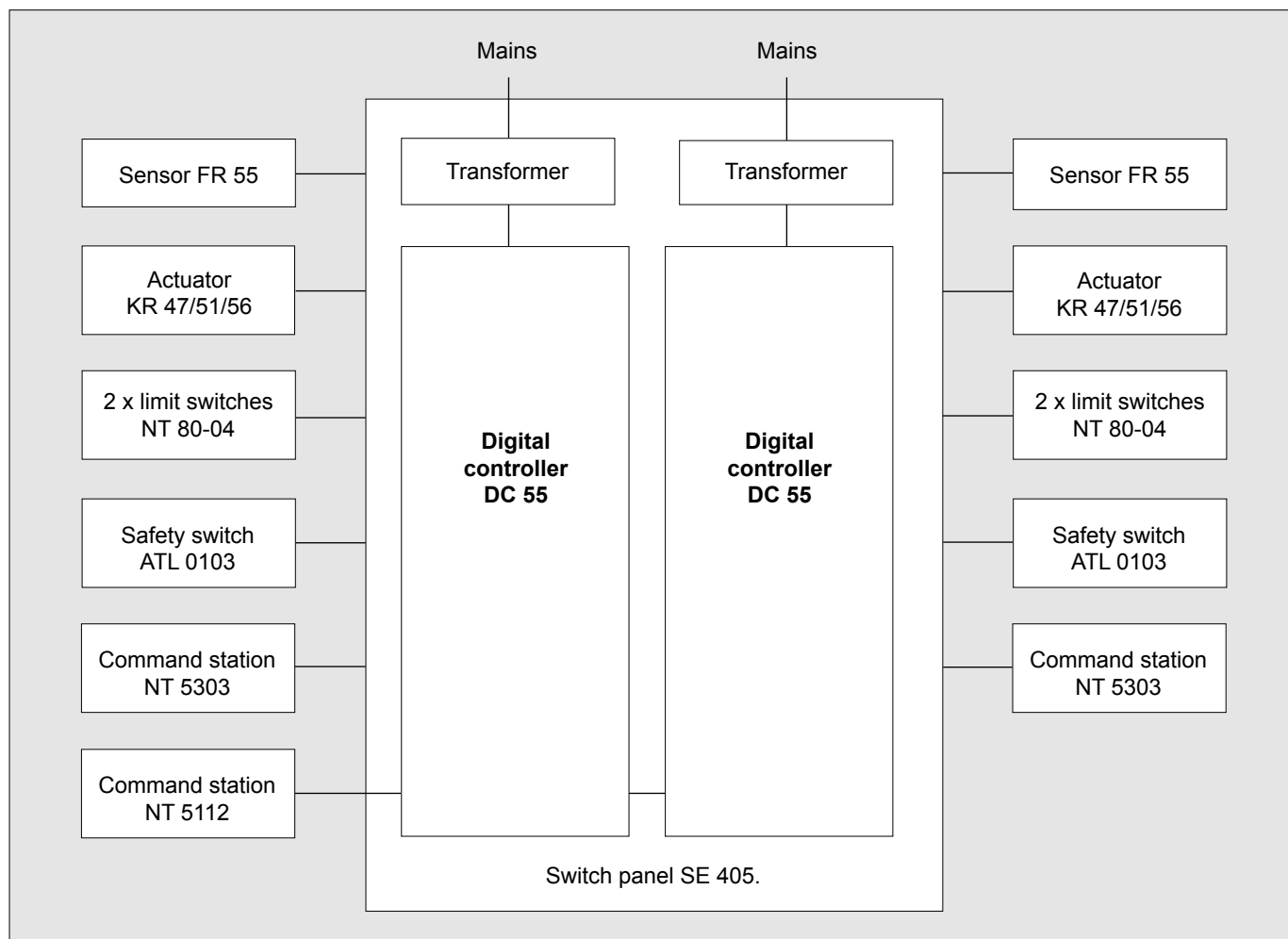
- two FR 55 sensors
- two **KR 47** actuators
- two sets of NT 80-04 rail limit switches
- two ATL 0103 safety switches
- **two** digital controller DC 55 with one transformer apiece
- command stations NT 5112 (1x) and NT 5303 (2x)

### 1.2.4 Tender guider infeed KRS 56 (KRS 55)

E+L tender guider infeed **KRS 56 (KRS 55)** consists of:

- two FR 55 sensors
- two **KR 56 (KR 51)** actuators
- two racks
- two sets of NT 80-04 rail limit switches
- two ATL 0103 safety switches
- **two** digital controllers DC 55 with one transformer apiece
- command stations NT 5112 (1x) and NT 5303 (2x)

Design: tender guider infeed KRS 49,  
KRS 55 and KRS 56

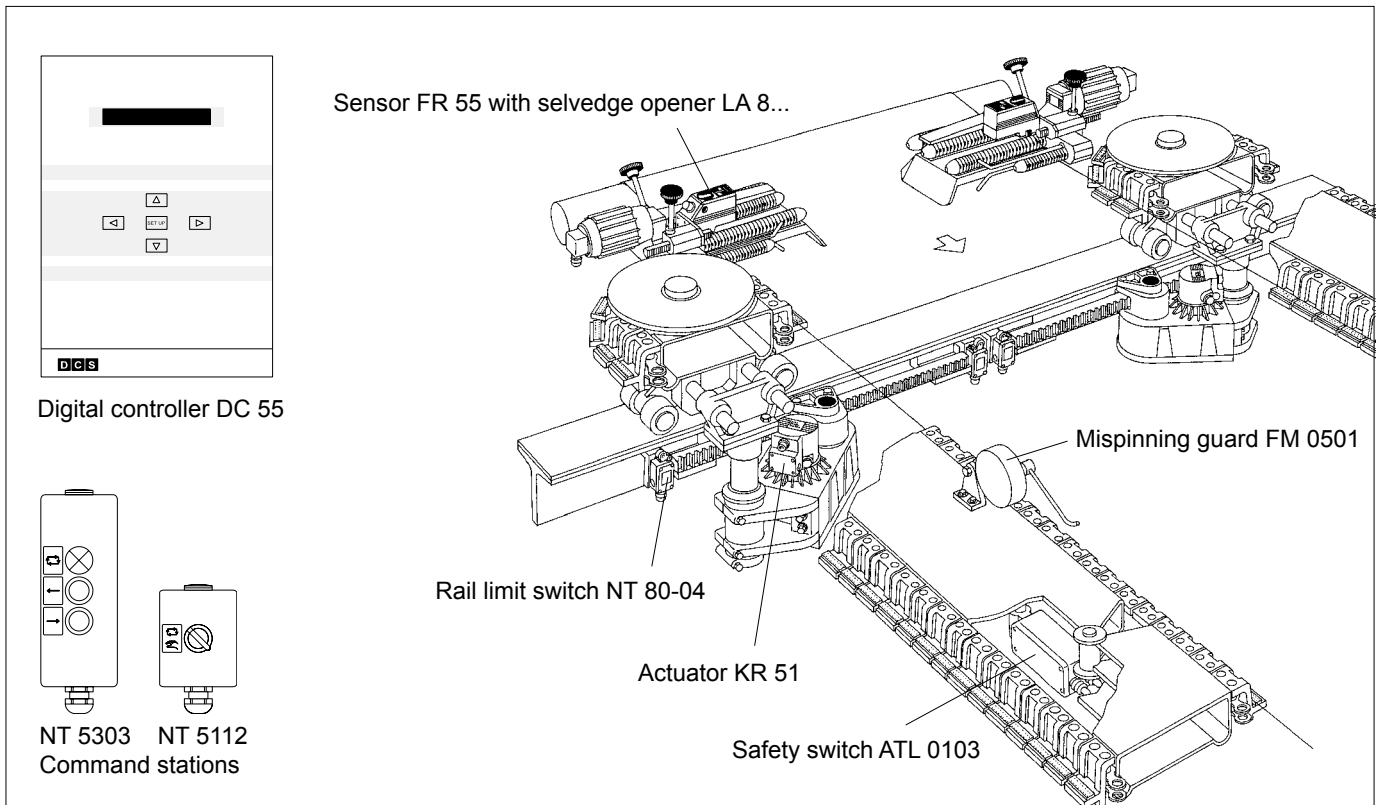


### 1.2.5 Accessories

Each of the tender guider infeeds may be equipped with the following accessories:

- selvedge opener - mechanical LS 11, electrical LA 8 or pneumatic LP 03
- mispinning guard FM 0501
- digital interface DI ..

### 1.3 Operating principle



#### Example:

Tender guider infeed KRS 51  
with actuator KR 51

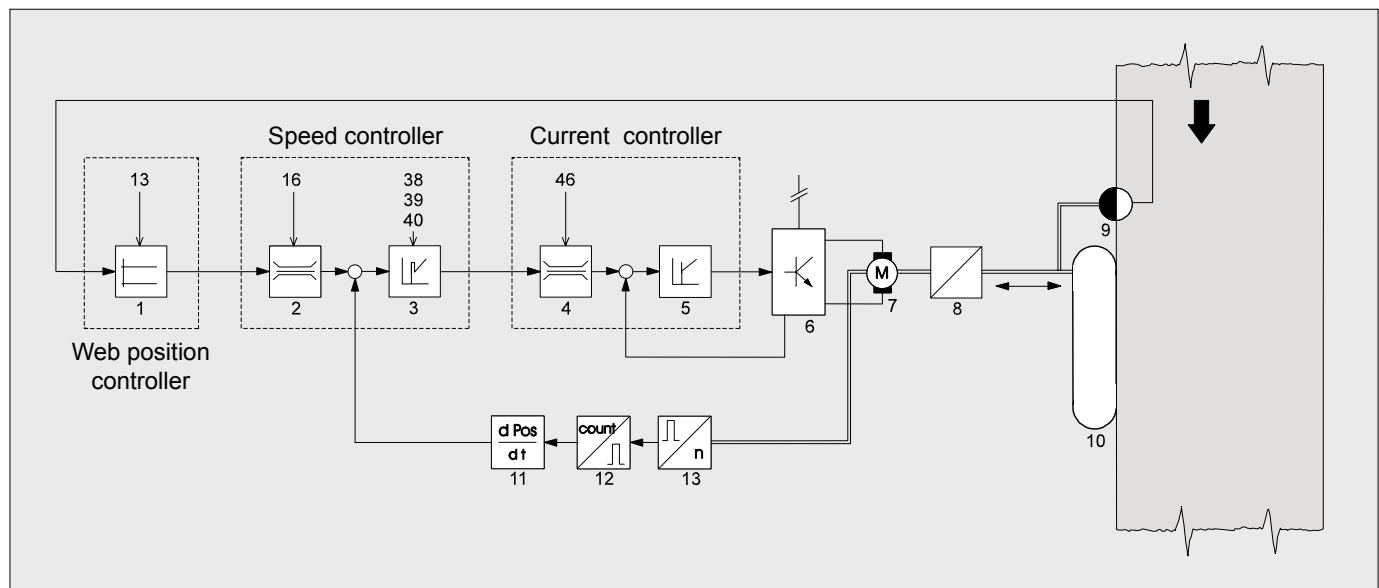
Selvedge openers uncurl the rolled edges of webs to assure that these may be detected and taken up by the pins optimally.

The sensors are mounted on the infeed rails and scan the web edges. If the infeed rail actual position value deviates from the set position value (sensor center), the appropriate sensor sends the magnitude and direction of the deviation to the digital controller for evaluation. The latter sends an appropriate correction signal to the actuator. The actuator corrects the position of the infeed rail and thus assures correct web take-up.

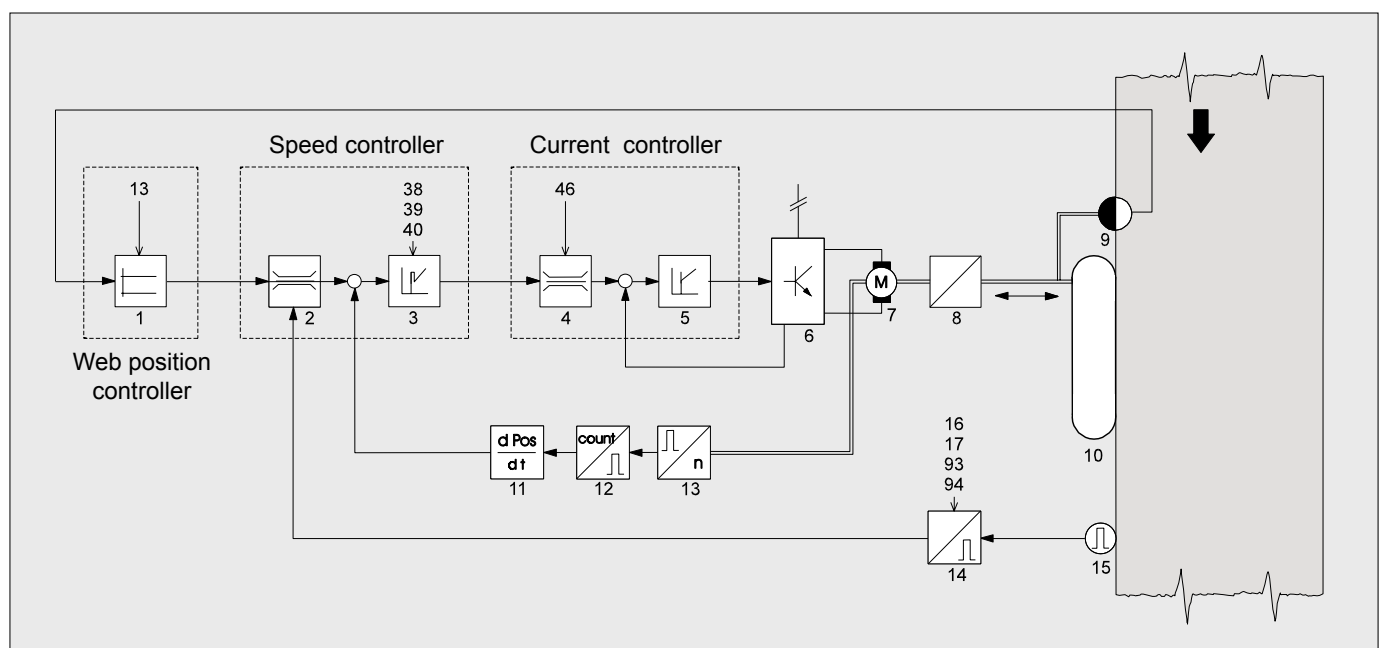
The actuator and digital controller are equipped with a temperature monitor. This prevents the components overheating via a temperature-dependent reduction of power (max. motor current/max. actuating speed). The safety device is only activated in the event of an overload.

The mispinning guard monitors pinning or clipping at the tender infeed.

## 1.4 Control diagram KRS .. mit DC 5501



## 1.5 Control diagram KRS .. mit DC 5506



The DC 5506 digital controller additionally features a pulse input (14) for recording the web speed which permits the maximum infeed rail actuating speed to be limited according to the current web speed in automatic mode. The infeed rail actuating speed is thus changed according to the web speed.

**Control diagram legend**

- 1 Web position controller
- 2 Actuating speed limit  $V_{max}$
- 3 Speed controller
- 4 Variable current limiter  $I_{max}$
- 5 Current controller

- 6 Power unit with mains power reclamation
- 7 Actuator
- 8 Gearing with rack/screw
- 9 Edge sensor
- 10 Infeed rail

- 11 Actual speed detection
- 12 Counter
- 13 Incremental encoder
- 14 Web speed-dependent speed limiter
- 15 Pulse generator

## 2. Assembly

**!** Please observe the locally applicable and professional safety and accident prevention regulations!

### 2.1 Actuators

→ See actuator description and dimensioned drawing.

### 2.2 Rail limit switch NT 80-04

→ See actuator description.

### 2.3 Safety switch ATL 0103

→ See safety switch description.

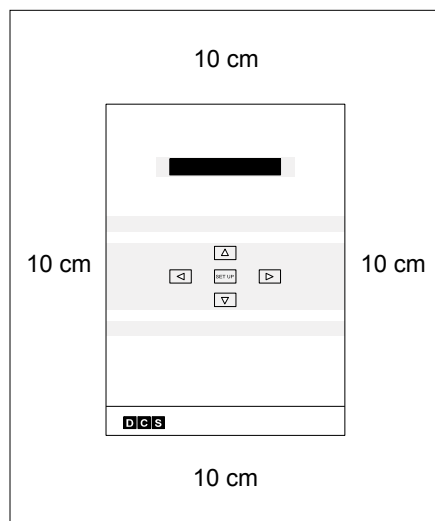
### 2.4 Selvedge opener (optional)

→ See selvedge opener description and dimensioned drawing. See also actuator description, application instructions section.

### 2.5 Sensors

→ See sensor description and dimensioned drawing. See also actuator description, application instructions section.

### 2.6 Digital controller DC 55



Digital controller DC 55.. can be supplied separately, in an E+L control cabinet or as a switch panel SE 405. with transformer.

Please observe the following when mounting the digital controller:

The digital controller should be mounted upright to achieve optimum ventilation, see illustration. A distance of approx. 10 cm between the controller and other devices should at the same time be observed.

Please ensure that the place of installation is well ventilated. The ambient temperature may not exceed 60 °C. The internal fan is switched on from a heat sink temperature of 40 °C. Power reduction begins from a heat sink temperature of 60 °C.

### 2.7 External pulse generator (on DC 5506 only)

→ See pulse generator description.

### 2.8 Command stations

→ Mount the command stations at a location where a good view of the infeed rails is assured.

### 2.9 Mispinning guard

→ See mispinning guard description.

### 3. Installation

! Please observe the locally applicable and professional safety and accident prevention regulations!

→ It is essential that the electrical lines be connected exactly as indicated in the wiring diagrams.

Leads not supplied by E+L must conform to E+L cables, i.e. also protected so that all connections may be carried out as indicated in the wiring diagrams.

Signal lines should be shielded and run apart from heavy current-carrying leads.

**All E+L components (command parts, controller, switch panels, actuators and sensors must be connected to the same frame potential as the whole machine. See enclosed EMC info sheet.**

#### 3.1 Digital controller DC 55

The entire electrical wiring for the E+L DC 55 digital controller is to be performed on site by the customer. Please thereby observe the instructions regarding the mounting location for the devices: on the right or left, as seen from the direction of web travel.

The length of the connection lines between the digital controller and the sensor and the digital controller and actuator must not exceed a maximum of 25 m. Longer lines may only be implemented subject to prior consultation with E+L.

One transformer per digital controller DC 55 must be used for the voltage supply. The secondary winding of the transformer must not be grounded (no connection to protective conductor PE).

→ Adapt the primary terminal of the multi-range transformer supplied by E+L to the existing power system. The multi-range transformer may be adjusted in 10 V increments.

If an over-voltage of more than 10% above the nominal voltage is anticipated, the transformer should be set to the higher voltage value. In the event of over-voltage, the tolerance values on the secondary side will also be exceeded with the result that error messages may arise.

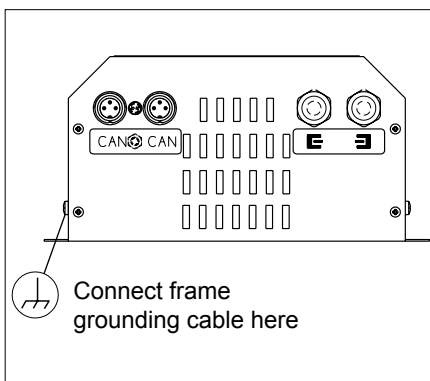
If, for instance, the nominal voltage is 400 V and the actual voltage available 420 V, the multi-range transformer should be set to 420 V.

→ The primary terminal of the multi-range transformer supplied by E+L should be protected on-site.

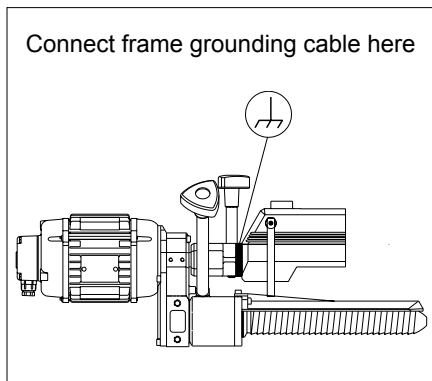
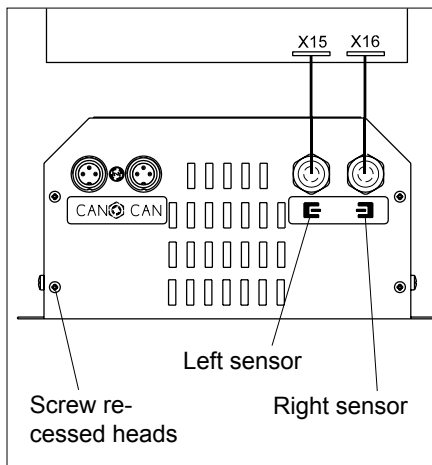
→ Check the secondary and ground connections of the wire screen on the multi-range transformer supplied by E+L.

If the multi-range transformer supplied by E+L is mounted in an E+L switch panel SE 405., a fuse must be switched between the secondary connection and the controller input, see switching recommendation in the wiring diagram. The secondary side must be ungrounded..

→ Connect the digital controller housing to the machine frame. The frame grounding cable cross-section must be at least 4 mm<sup>2</sup>.



### 3.2 Sensors



→ Remove the side panel on the digital controller, see illustration opposite. The side panel is secured by 4 screw recessed heads.

→ Connect the sensor cable on the digital controller.

- On tender guider infeeds with a digital controller (KRS 47/51/52), connect the sensor mounted on the right in the direction of web travel to connector X16 and the sensor mounted on the left in the direction of web travel to connector X15. Observe sign on the back of the side panel.

|| The digital controller assigns the sensor on connector X16 address 0.1 (right sensor) and the sensor on connector X15 address 0.2 (left sensor) (parameter 73, default value 1).

- On tender guider infeeds with **two** digital controllers (KRS 49/55/56), one sensor per controller should be connected to connector X16, see wiring diagram.

→ Resecure side panel.

→ Protect and run the sensor cable away from heavy current-carrying leads. Secure the sensor cable with a strain relief device.

→ Tighten the coupling ring on the sensor cable connector. The coupling ring provides a conductive connection between the sensor housing and the sensor cable shield.

→ Connect the sensor housing to the machine frame, see figure opposite. The grounding cable cross-section must be at least 4 mm<sup>2</sup>.

### 3.3 Actuators

→ See actuator description.

- On tender guider infeeds with **one** digital controller (KRS 47/51/52) connect the actuator mounted on the right in the direction of travel to terminal strip X5, and the actuator mounted on the left in the direction of travel to terminal strip X2.

- On tender guider infeeds with **two** digital controllers (KRS 49/55/56), connect one actuator per controller to terminal strip X5, see wiring diagram. Furthermore, bridge the motor connections of terminal strips X 2 and X 5 (close in parallel), see wiring diagram.

### 3.4 Safety switch ATL 0103

→ See ATL safety switch description.

### 3.5 External pulse generator (on DC 5506 only)

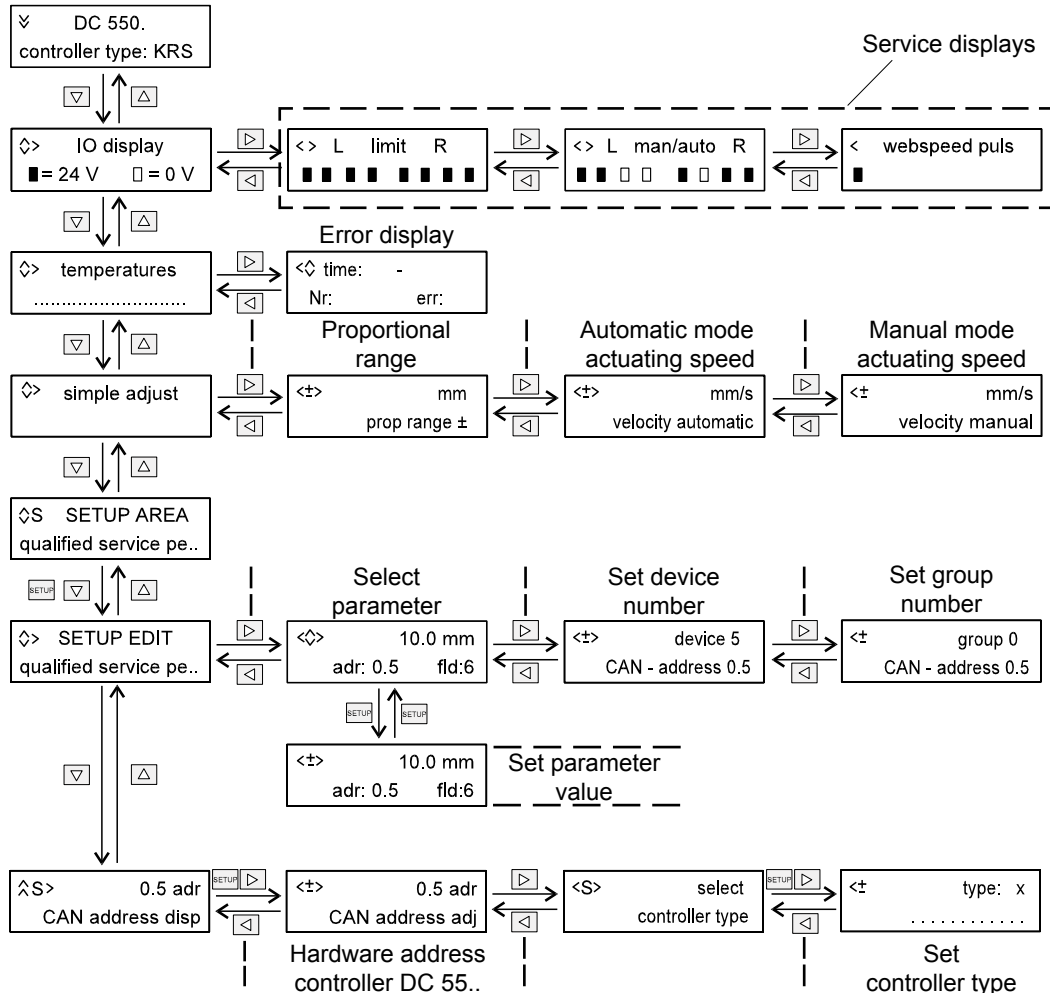
→ Connect external pulse generator (10 - 100 pulses per meter, 24 VDC) to the controller DC 5506.

### 3.6 Selvage opener (optional)

→ See selvage opener description.

## 4. Setup editor

### Basic operation of setup editor on digital controller DC 55..



The setup editor is used to set the parameters on digital controller DC 55. Use the cursor keys to enter setup mode. In setup mode, parameters may be displayed and some changed.

In the top left corner of the display, arrows indicate which keys may be actuated.

↕ .....  
.....

- A double arrow on the vertical indicates the beginning or end of the menu display.

◇S> .....  
.....

- If a "S" appears in front of an arrow, first press the SETUP key and then the arrow key to move in the direction displayed.

<±> 0 Group  
.....

- If a "±" appears between the arrows, the value displayed may be changed by the keys.

<±> -5 Device  
.....

- If a minus sign appears in front of the value when a CAN address is entered, this indicates that no device exists with this address.

↕ DC 55 (C) E+L  
.....

Once parameter setting is complete, always return to the first window.

## 4.1 Parameter list

The parameter number is specified in the **Number** field of the table, in the **Name** field the abbreviation. The **Default** field indicates the standard settings, **Min** and **Max** are the respective permissible limit values. The unit is indicated in the **Unit** field. The **Description** explains the parameter function. If a dot (•) is featured after the parameter number, this denotes a display parameter the value of which cannot be changed.

The following parameter list indicates the parameters of digital controller DC 55.

From software version 1.4 (E) of digital controller DC 55 onwards only the type of controller set in each case will be displayed.

Controller type 0 = KRS 47/51

Controller type 1 = KRS 49/55

Controller type 2 = KRS 52

Controller type 3 = KRS 56

No.	Name	Default	Min.	Max.	Unit	Description
..0.	edit device	5	1	F	hex	<b>Select device number</b> See block diagram for device number
..1.	edit group	0	0	7	hex	<b>Select group number</b> See block diagram for group number
..2.	reset settings	0	0	2		<b>Works settings</b> 0 = no function 1 = perform customers settings 2 = perform internal default settings
..3.	start service	0	0	199		<b>Starting a funktion</b> 0 = no function 1 = reset controller 2 = save parameter 20 = calibration motor right !!!! 21 = calibratiom motor left !!!! 22 = save calibration values !!!! 42 = select expanded setup 44 = save customer settings 98 = delete error memory 99 = delete data memory
..4. •	DC 5501	1.4	1.4	1.4	E+L	<b>Software version</b> 1.0 = version .._ZA 1.1 = version .._ZB u.s.w.
..5. •	<b>webedge offset</b>					
..6.						no function
..7.						no function
..8.						no function
..9.						no function
..1.0.						no function
..1.1.						no function

No.	Name	Default	Min.	Max.	Unit	Description
.1.2. •	<b>webedge controller</b>					
.1.3.	prop range +/-	10.0	-2000.0	2000.0	mm	<b>Proportional range of controller</b> smaller value -> invrease sensitivity
.1.4.	dual-rate width	30	10	100	%	<b>Window width in % in reference to the captive range of the sensor</b> Within the given window width the actual positioning speed is multiplied by the factor set in parameter 15. Within the given window width the actual positioning speed is multiplied by the factor set in parameter 15.
.1.5.	dual-rate level	50	10	100	%	<b>Reduction of positioning speed</b> Within the pre-set window width and with respect to the linear characteristics of the positioning speed.
.1.6.	velocity automatic	80	0	180	mm/s	<b>Positioning speed max. automatic mode</b> KRS 47/51/52: 130 mm/s KRS 49/55/56: 180 mm/s
.1.7.	velocity automatic min	50	0	180	mm/s	<b>Minimum positioning speed in automatic mode when web speed is being acquired</b> see parameter P93 and P94
.1.8.	velocity manual	50	0	180	mm/s	<b>Positioning speed max. manual mode</b> KRS 47/51/52: 50 mm/s KRS 49/55/56: 180 mm/s
.1.9.	velocity endposition	10	1	40	mm/s	<b>Follow-up speed back from limit switch</b>
.2.0. •	derated velocity R	—	0	180	mm/s	<b>Actual positioning speed max. automatic mode motor right</b>
.2.1. •	derated velocity L	—	0	180	mm/s	<b>Actual positioning speed max. automatic mode motor left</b> nur bei Reglertyp 0 und 2
.2.2.						no function
.2.3.						no function
.2.4. •	<b>servo configuration</b>					
.2.5.	motion direction	0	0	1		<b>Motor direction</b> Depends on mounting location and direction of web travel 0 = normal 1 = invers
.2.6.						no function
.2.7.						no function
.2.8. •	motor gear constant	—	1.00	99.99	Imp/mm	<b>Gear constant</b> Calculated from encoder resolution P29 and gear transmission P30 for display only
.2.9.	encoder resolution	50	8	9999	Imp/U	<b>Encoder resolution</b> Input of actual impulses/U (without 4-times evaluation) Default value for actuator KR 47/51: 50 KR 52: 25 KR 56: 25
.3.0.	rotation gear	30.00	0.01	320.00	mm	<b>Gear transmission of motor</b> KR 47: 7.25 x enter ratio for chain drive Default value for actuator KR 51: 30 KR 52: 40 KR 56: 40

No.	Name	Default	Min.	Max.	Unit	Description
.3.1.	linear gear	188.00	0.01	320.00	mm/U	<b>Linear gear transmission</b> Ratio of transmission from rotational to linear movement KR 47: Enter spindle pitch Default value for actuator KR 51: 188.0 KR 52: 188.0 KR 56: 188.0
.3.2.						no function
.3.3.						no function
.3.4.						no function
.3.5.	position P	0.100	0.001	1.000		<b>P-share for position controller</b>
.3.6. •	<b>speed controller</b>					
.3.7.	max.rot.speed	1250	100	3000	U/min	<b>Characteristics motor r.p.m.</b> Value is required for limitation of motor speed. The max. motor speed is: $P_{max} = \text{max. rot. speed} * \text{current maximum}$ Default value for actuator KR 47/51: 1250 KR 52/56: 1600
.3.8.	speed_P	2.00	0	10.00		<b>P-share for speed controller</b> Default value for actuator KR 47/51: 2.00 KR 52/56: 0.75
.3.9.	speed_I	0.05	0	5.00		<b>I-share for speed controller</b> Default value for actuator KR 47/51: 0.05 KR 52/56: 0.04
.4.0.	speed_D	0	0	5.00		<b>D-share for speed controller</b>
.4.1. •	act. speed R	—	-3500	3500	U/min	<b>Actual motor r.p.m. Right hand</b> measured via encoder
.4.2. •	act. speed L	—	-3500	3500	U/min	<b>Actual motor r.p.m. Left hand</b> measured via encoder
.4.3. •	IxR act. speed R	—	-3500	3500	U/min	<b>Actual motor r.p.m. Right hand</b> measurement via motor voltage In normal operation it must just about correspond to the encoder r.p.m.
.4.4. •	IxR act. speed L	—	-3500	3500	U/min	<b>Actual motor r.p.m. Left hand</b> measurement via motor voltage In normal operation it must just about correspond to the encoder r.p.m.
.4.5. •	<b>current controller</b>					
.4.6.	current maximum	8.0	0.0	16.0	A	<b>Max. motor rated current</b> Default value for tender guider infeed KRS 47/51: 8.0 A KRS 52: 8.0 A KRS 49/55: 16.0 A KRS 56: 12.0 A
.4.7. •	limited current R	—	0.0	16.0	A	<b>Actual max. motor current Right hand</b> Limitation of motor current depends on motor temperature
.4.8. •	limited current L	—	0.0	16.0	A	<b>Actual max. motor current Left hand</b> Limitation of motor current depends on motor temperature Only for controller type 0 and 2

No.	Name	Default	Min.	Max.	Unit	Description
.4.9.	overdrive factor.	1.50	1.00	2.00		<b>Factor motor current overdrive</b> The motor current is increased by the preset factor. It is limited, however, to max. power.
.5.0.	derating temp.	65	40	75	°C	<b>Motor nominal temperature</b> From this temperature onwards the motor current is reduced. The actually acceptable motor current is shown in parameter "limited current R/L" (P47 und P48).
.5.1. •	act. current R	—	-51,2	51,2	A	<b>Measured motor current right</b>
.5.2. •	act. current L	—	-51,2	51,2	A	<b>Measured motor current left</b> Only for controller type 0 and 2
.5.3.						no function
.5.4.						no function
.5.5. •	<b>diagnostics</b>					
.5.6. •	system error	—				<b>Error display</b> 1 = UAC power low 2 = UAC power high 3 = UDC inter. low 4 = UDC inter. high 5 = UDC sec.1 fault 6 = UDC sec. 2 fault 7 = 24 V extern fault 8 = 24 V intern low 9 = 24 V intern high 10 = emergency loop 11 = I inter. fault 12 = READY out fault 13 = AUTO out fault 14 = FAN out fault 15 = I motor R high 16 = I motor L high 17 = Temp case high 18 = Temp motor R high 19 = Temp motor L high 20 = encoder R fault 21 = encoder L fault 22 = encoder R invers 23 = encoder L invers 24 = sensor R fault 25 = sensor L fault 26 = gear constant fault 27 = power off 28 = Temp motor R fault 29 = Temp motor L fault 30 = Motorline R fault 31 = Motorline L fault
.5.7.						no function
.5.8. •	Reset counter	—	0	9999		<b>Reset counter</b>
.5.9. •	running time meter	—	0	32000	h	<b>Time counter</b>
.6.0. •	input voltage AC	—	0.0	999.9	V	<b>Display input voltage</b>
.6.1. •	input voltage DC	—	0.0	999.9	V	<b>Display voltage intermediate circuit</b>
.6.2. •	supply voltage 24 VDC	—	0.0	999.9	V	<b>Display 24V-supply voltage</b>
.6.3.	temperature case	—	0	100	°C	<b>Display temperature heat sink</b> T > 40 °C fan ON T > 80 °C defect, final stage switches off

No.	Name	Default	Min.	Max.	Unit	Description
.6.4. •	temp. case max.	—	0	100	°C	<b>Display of max. temperature reached by heat sink</b>
.6.5. •	temperature motor R	—	0	500	°C	<b>Display motor temperature right</b> T > 85 °C defect, final stage switches off
.6.6. •	temperature motor L	—	0	500	°C	<b>Display motor temperature left</b> T > 85 °C defect, final stage switches off Only for controller type 0 and 2
.6.7.	enc-test off/ on/ IR	1	0	2		<b>Motor encoder monitoring</b> 0 = OFF 1 = ON, with autom. switching to IxR 2 = OFF, r.p.m. control with IxR compensation
.6.8.	enc-test delay	1	1	10	s	<b>Encoder monitoring delay</b>
.6.9.						no function
.7.0. •	<b>configuration</b>					
.7.1. •	<b>controller type</b>	—	0	1		<b>Type of controller</b> 0 = KRS 47/51 1 = KRS 46/55 2 = KRS 52 3 = KRS 56 Setting performed via keyboard on controller DC 55..
.7.2.						no function
.7.3.	auto address	1	0	2		<b>Automatic address assignment for sensor</b> 0 = Display only for sensor addresses 1 = automatic setting of sensor addresses to x.1/x.2 2 = setting the sensor addresses to the addresses defined in parameter 74 and 75
.7.4.	connector Right	x.x	0.0	7.F		<b>Sensor address, plug location right</b>
.7.5.	connector Left	x.x	0.0	7.F		<b>Sensor address, plug location left</b>
.7.6.	rel switch on time	0.2	0.1	1.5	sec	<b>Intermediate circuit relay switching delay</b>
.7.7.	endswitch invert	0.0	0.0	F.F		<b>Inversion of limit switch inputs</b>
.7.8. •	<b>calibration</b>					
.7.9.	calib. UAC	1.00	0.90	1.10		<b>Calibration of input voltage</b>
.8.0.	calib. UDC	1.00	0.90	1.10		<b>Calibration of voltage intermediate circuit</b>
.8.1.	calib. I-set R	1.00	0.90	1.10		<b>Calibration of current meter r.h. motor</b>
.8.2.	calib. I-set L	1.00	0.90	1.10		<b>Calibration of current meter l.h. motor</b>
.8.3.	offset I-act R	0	-50	50		<b>Offset current measurement motor right</b>
.8.4.	offset I-act L	0	-50	50		<b>Offset current measurement motor left</b>
.8.5.	offset I-set R	0	-50	50		<b>Offset current output motor right</b>
.8.6.	offset I-set L	0	-50	50		<b>Offset current output motor left</b>
.8.7.	offset U-motor-R	0	-50	50		<b>Offset voltage measurement motor right</b>
.8.8.	offset U-motor-L	0	-50	50		<b>Offset voltage measurement motor left</b>
.8.9.	speed constant	47	0	20000	U/V	<b>Motor speed constant</b> value is required for computing the motor speed via the IxR compensation Default value for actuator KR 47/51: 47 KR 52/56: 68
.9.0.	IxR compensation	0	2	20000	mOhm	<b>Motor internal resistance</b> value is required for controlling the motor speed via the IxR compensation
.9.1.	powerderate limit	60	50	65	°C	<b>Temperature heat sink</b> from this temperature performance is limited

## Tender Guider Infeed KRS

No.	Name	Default	Min.	Max.	Unit	Description
.9.2. •	<b>webspeed config.</b>					
.9.3.	webspeed constant	10	10	100	l/m	<b>No. of pulses per meter of web</b>
.9.4.	webspeed max.	0	0	1000	m/min	<b>Maximum web speed</b>
.9.5. •	actual webspeed	—	0	1000	m/min	<b>Display of actually measured web speed</b>
.9.6. •	<b>!! SERVICE !!</b>					
.9.7.	service off / on	0	0	1		<b>Switch on service mode</b> <b>! for service personnel only !</b> Reset to 0 after "Reset"
.9.8.	<b>IC control on/off</b>	0	0	1		<b>Switch off intermediate circuit controller</b> <b>! for service personnel only !</b> Reset to 0 after "Reset"
.9.9.	service mode	0	0	7		<b>Service mode</b> <b>! for service personnel only !</b> 1 = motor stages deactivated 2 = test current controller square 3 = test current controller delta 4 = test speed controller square 5 = test speed controller delta 6 = sensor signal square 7 = sensor signal delta
1.0.0.	test value 1	0	-100	100	%	<b>Test value 1 for service mode</b> <b>! for service personnel only !</b>
1.0.1.	test value 2	0	-100	100	%	<b>Test value 2 for service mode</b> <b>! for service personnel only !</b>
1.0.2.	test cycle time	0.00	0.00	10.00	s	<b>Test cycle time for service mode</b> <b>! for service personnel only !</b>

## 5. Commissioning

**!** During commissioning or operation no-one must remain in the danger area around the tender machine. Please observe the locally applicable and professional safety regulations.

II Commission the tender guider infeed without a web.

### 5.1 Safety measures prior to switching on the power supply

- Check that the individual leads have been wired correctly.
- Actuator KR 47: Decouple the screw from the gearing to prevent the infeed rails moving during the electrical function test.
- Actuator KR 51/52/56: Remove the rack lock from the rack and swivel the pinion out of the rack to prevent the infeed rails moving during the electrical function test.
- Set the infeed rails approx. in the center to prevent the rail limit switches and safety switch ATL 0103 being triggered inadvertently.

**!** Do not switch on the selvedge opener motors during commissioning or work on the infeed rails and edge sensors. Risk of injury!

- Set the mode selector manual - automatic mode to "manual".

### 5.2 System test

- Switch on the power.

Once switched on, the controller runs a system test. It checks the internal and external supply voltages, operating temperature and whether the motor, incremental encoder and sensor are connected.

- If controller DC 55 is operational, the first menu window with the controller type appears on the LCD display. See figure opposite. Commissioning may be continued from step 5.3 Check controller type.
- If no display appears, check the operating voltage, it may be too high (max. 34 V AC +10 %, -15 %), preventing the controller from switching on. If necessary, check the emergency OFF circuit.
- If the error message opposite is displayed, a fault has been detected during the system test. The error code is indicated in the first line of the display, in the second line a short error description is flashed across the display.

The error must be cleared before commissioning may be continued from step 5.3. See section "Error messages".

DC 55–  
controller type: stender guider KRS 47/51

Example: controller type display

Error:           xx.x  
.....

Error message



## 5.5 Check function of limit switches and control push buttons

### Limit switches

<>	L	limit	R				
0■	1■	2■	3■	4■	5■	6■	7■

#### Left infeed rail in direction of web travel

0	X1/4	Outer safety switch	ATL 0103
1	X1/8	Outer slide rail limit switch	NT 80-04
2	X1/6	Inner slide rail limit switch	NT 80-04
3	X1/3	Inner safety switch	ATL 0103

#### Right infeed rail in direction of web travel

4	X4/4	Inner safety switch	ATL 0103
5	X4/8	Inner slide rail limit switch	NT 80-04
6	X4/6	Outer slide rail limit switch	NT 80-04
7	X4/3	Outer safety switch	ATL 0103

### Control push buttons

<>	L	man/auto				R	
0■	1■	2	3	4■	5	6■	7■

#### Left infeed rail in direction of web travel

0	X3/11	Manual outer
1	X3/12	Manual inner
2		not assigned
3		not assigned

#### Right infeed rail in direction of web travel

4		not assigned
5	X3/2	Automatic ON
6	X6/12	Manual inner
7	X6/11	Manual outer

LCD displays on controller DC 55

- Call up the "limit" menu. Actuate the limit switches on the left and right infeed rail one after the other while checking their function on the basis of the LCD display, see illustration above. A closed power circuit is displayed by a black square, an open power circuit by a white square.
- Call up "man/auto" menu. Actuate push buttons for automatic and manual mode one after the other while checking their function on the basis of the LCD display, see illustration above. A closed power circuit is displayed by a black square, an open power circuit by a white square.

## 5.6 Check function of the external pulse generator (on DC 5506 only)

<	webspeed puls
0■	

- Call up "webspeed pulse" menu.

If a pulse generator signal is available on controller DC 5506 (terminal X6/2) it will be displayed by a black square. Due to the display time lag only static signals are displayed.

## 5.7 Check CAN bus

- Check the CAN bus connections. The CAN bus connection LEDs on the digital controller and sensors should light up green, i.e. operational. If a LED lights up red, there is a malfunction on the CAN connection in question. Check the device and CAN cable.

## 5.8 Checking automatic mode

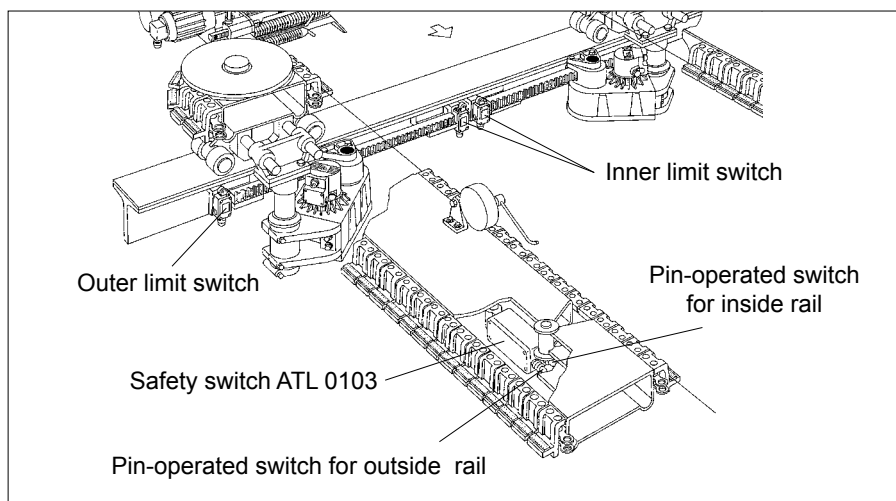
### 5.8.1 Motor direction of rotation

**In order to check the motors, the sensors must be correctly connected. The rail limit switches and safety switches must be off, i.e. not actuated.**

- Set the mode selector to "automatic" mode.
- Check the motor direction of travel.
 

Sensor uncovered	Infeed rail moves to inside
Sensor covered	Infeed rail moves to outside
- If the actuating movement is in the wrong direction but the speed right (KRS 47: approx. 100 min<sup>-1</sup>, KRS 51/52: pinion approx. 27 min<sup>-1</sup> and KRS 55/56: pinion approx. 43 min<sup>-1</sup>) check the mounting location of the actuators, see actuator description. If necessary, reverse the motor effective direction in parameter 25 "Mounting location".
- Do not turn the motors:
  - Check parameter 46 "Motor current". Value possibly wrongly set.
  - Check parameter 51 and 52 "act. motor current". If the motor current is > I max, check the motor output for a short circuit.

### 5.8.2 Limit switches



- Check the function of the limit switches.
  - When the sensor is uncovered, actuate the inner limit switch on the rack. The motor is switched off.
  - When the sensor is covered, actuate the outer limit switch. The motor is switched off.

If necessary, swap the limit switch connections. See also menu Limit.

### 5.8.3 Safety switch ATL 0103

- Check the safety switch, also see diagram. The safety switches have two pin-operated switches with three switch settings each.
- 1. When the sensor is uncovered, actuate the pin device on the inside of the rail until the first setting position is reached. The motor effective direction is reversed, the rail moves to the outside at the speed set in parameter 19 until the pin device is released again.
- 2. Actuate the pin device on the inside of the rail until the second setting position is reached. The operating voltage for controller is switched off via the emergency OFF circuit until the pin device is released again.
- 3. Actuate the pin device on the inside of the rail until the third setting is reached. The tender width adjustment is switched off provided the contact is connected on-site.
- 4. When the sensor is covered, actuate the pin device on the inside of the rail until the first setting is reached. The effective direction of the motor is reversed, the rail moves to the inside at the speed set in parameter 19 until the pin device is released again.
- 5. Actuate the pin device on the inside of the rail until the second setting is reached. The operating voltage is switched off in controller DC 55 via the emergency OFF circuit until the pin device is released again.
- 6. Actuate the pin device on the inside of the rail until the third setting is reached. The tender width adjustment is switched off provided the contact is connected on-site.

### 5.9 Checking manual mode

- Set the mode selector to "manual".
- Check manual functions.
  - Manual to inside Infeed rail moves to inside
  - Manual to outside Infeed rail moves to outside
  - Swap push button connections if necessary.

### 5.10 Establishing total gear constant (for KRS 47/49 only)

- The total gear constant, parameter 28 "gear constant", of a tender guider infeed may be calculated on the basis of parameter 29 "encoder resolution", parameter 30 "rotation gear" and parameter 31 "linear gear".

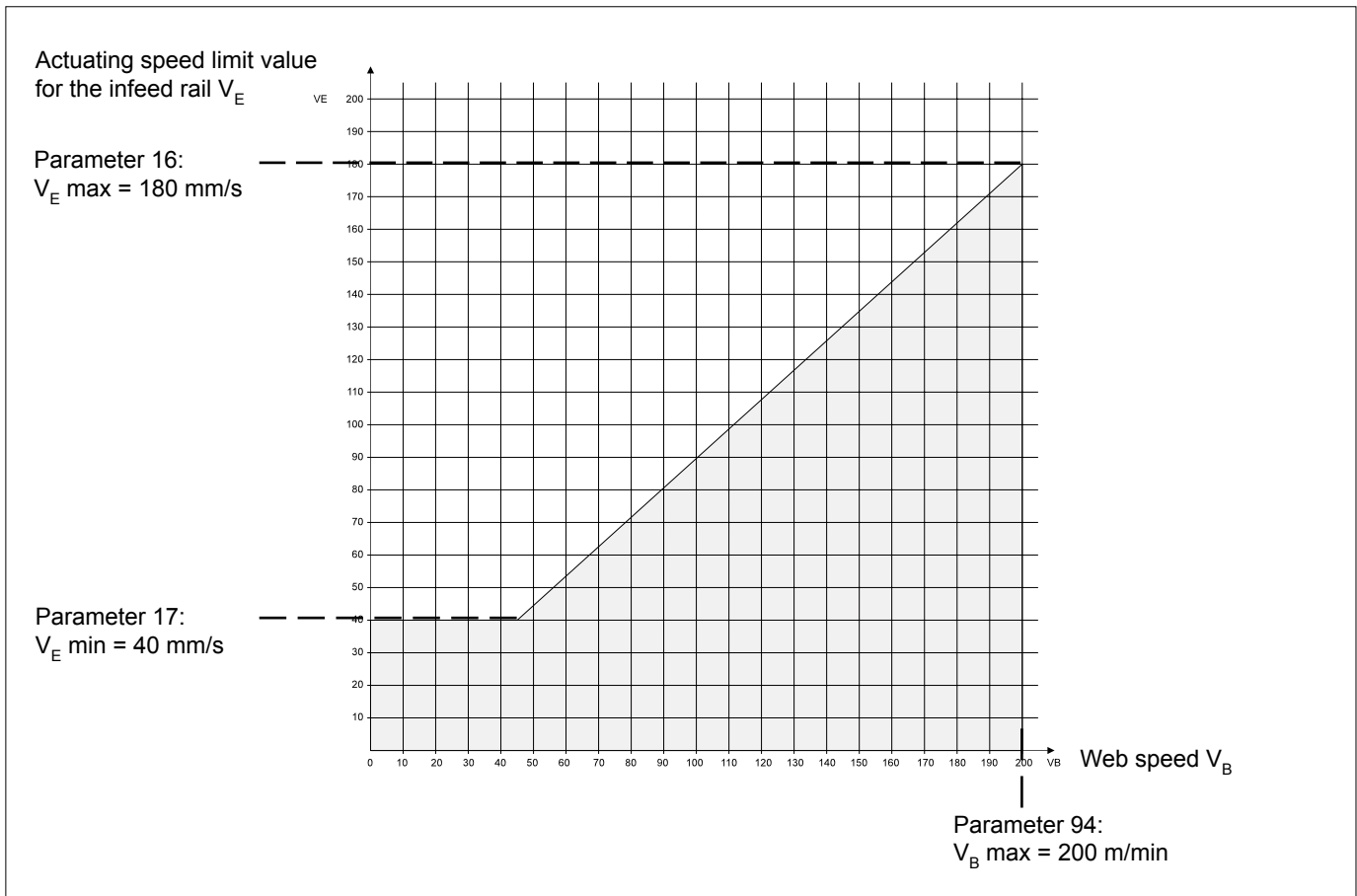
On tender guider infeeds KRS 47/49 the parameter values must be established on-site.
- Parameter 29 "encoder resolution" (pulses per revolution of the encoder on the actuator) retains its default value: 50 pulses per revolution.

- Enter the gear transmission ratio between the spindle and motor in parameter 30 "rotation gear".
- If the E+L actuator is directly mounted on the spindle, enter the gear transmission ratio of the E+L actuator.
- If, for instance, the E+L actuator is linked to the spindle via a chain drive, calculate and enter the gear ratio  $i$  as follows:  

$$i = \text{E+L actuator gear ratio} \times \text{chain drive ratio}$$
- Enter the spindle pitch in millimeters per revolution in parameter 31 "linear gear".

### 5.11 Adjust infeed rail actuating speed to web speed (for DC 5506 only)

The digital controller DC 5506 additionally features a pulse input (14) for recording the web speed with which it is possible to limit the maximum infeed rail actuating speed according to the current web speed in automatic mode. The infeed rail actuating speed is thus changed according to the web speed.



Example

- Enter the no. of pulses per meter of web (10 - 100) of the external pulse generator in parameter 93.
- In parameter 94 enter the maximum web speed  $V_B \text{ max}$  in m/min at which the maximum infeed rail actuating speed is to be reached.
- In parameter 16 enter the maximum required infeed rail actuating speed  $V_E \text{ max}$ .
- In parameter 17 enter the minimum required infeed rail actuating speed  $V_E \text{ min}$ .

**5.12 Completing  
commissioning**

- Switch off the power.
- Set the infeed rails to approx. the center position.
- KR 47: connect screw and gearing.
- KR 51/52/56: connect gearing and rack and set eccentric lock without any play.

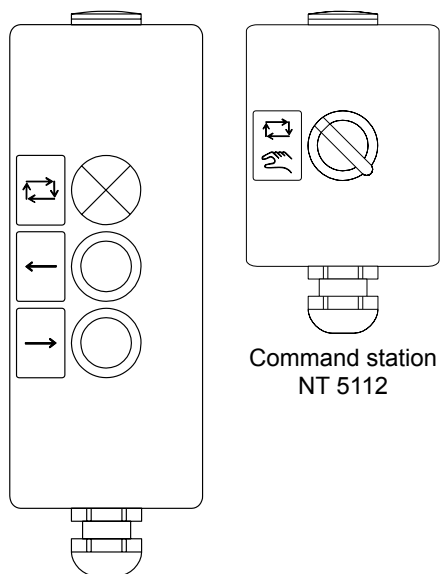
**Commissioning is thus complete.**

The tender guider infeed is now operational.

Digital controller DC 55 is set and tested by E+L. In the majority of cases, this setting obtains good results. Should this not be the case, various settings may be optimised, see "Optimisation" section.

## 6. Operation with command

### 6.1 Command stations



Command station NT 5303

The tender guider infeed is operated by command stations NT 5112 and NT 5303 (see illustration on left).

Use command station NT 5112 to choose between "automatic" and "manual" modes".

Use command stations NT 5303 to move the infeed rails to the right or left in automatic or manual mode. The "Automatic" display lights up when automatic mode is switched on. If the display flashes, a warning is being signalled, see error table in section 8.2.

### 6.2 Operating sequence

**! Only insert the web when the tender machine is switched off.  
Risk of injury!**

- Swivel out the overfeed roller from the chain (do not do so for clips).
- Enable the infeed roller drive.
- Select manual mode on command station NT 5112 and set the rail to the web width.
- Insert the web in the spreading and overfeed, close overfeed roller.
- Select automatic mode on command station NT 5112.
- Enable automatic mode.
- Enable tender guider and overfeed drive, enable mispinning guard if necessary.
- Check and set pinning if necessary.

## 7. Optimisation

Digital controller DC 55 has been set and tested by E+L. In most cases good results are obtained with this setting. If this is not the case, various settings may be optimized.

### 7.1 Premises for optimisation

The aim of optimisation is to minimise the controlling difference (difference between the set and actual values) as far as possible.

The tender guider infeed is optimally set if the infeed rail adjusts to the set position value (equivalent in value) in the shortest possible time in automatic mode. The time depends on the proportional range (parameter 13) and the actuating speed (parameter 16). Use these two parameters to determine the sensitivity and also specify the gain factor G or proportional amplification. See following illustration.

#### Example:

Absolute error 2 mm  
max. actuating speed 100 mm/sec.  
Proportional range 10 mm

#### Sensitivity or gain factor G (1/sec)

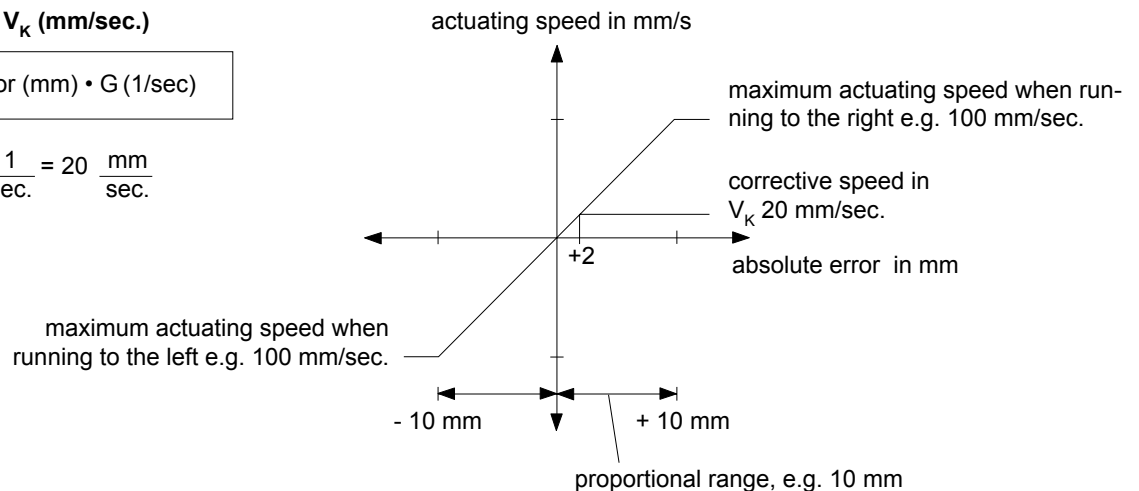
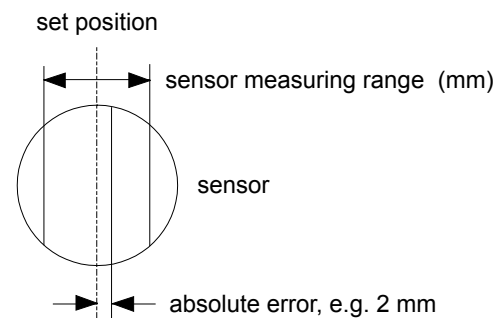
$$G = \frac{\text{max. actuating speedt (mm/sec.)} \cdot y}{\text{proportional range (mm)} X_p}$$

$$G = \frac{100 \text{ (mm/sec.)}}{10 \text{ (mm)}} = 10 \frac{1}{\text{sec.}}$$

#### Corrective speed $V_k$ (mm/sec.)

$$V_k = \text{absolute error (mm)} \cdot G \text{ (1/sec)}$$

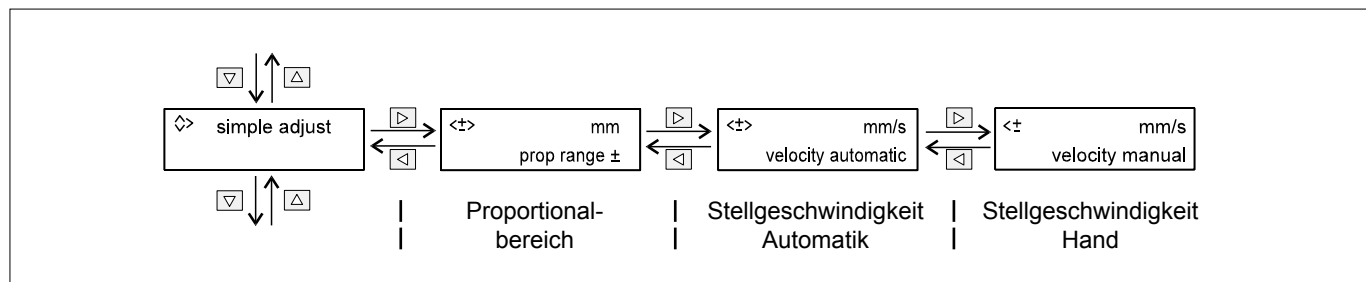
$$V_k = 2 \text{ mm} \cdot 10 \frac{1}{\text{sec.}} = 20 \frac{\text{mm}}{\text{sec.}}$$



Example: controller proportional range and actuating speed

## 7.2 Optimising the tender guider infeed

**The tender guider infeed is optimised while the web is moving.**



Simple menu level for optimizing the tender guider infeed

In automatic mode, the proportional range and actuating speed may be changed directly at the "simple adjust" level, in the "prop range  $\pm$ " / "speed automatic" field. Each value change is performed immediately.

- Select automatic mode.
- Set recommended values listed in table below. The values are related to the maximum web speed run.

In the case of mechanical scanning with a feeler and a poor or uneven web edge, the system may start to oscillate at a speed of 80 mm/sec. The maximum actuating speeds quoted may only be achieved with optical scanning and a stable web edge.

		Parameter 13	Parameter 16
Tender guider infeed	Maximum web speed	Proportional range	Actuating speed in automatic mode
KRS 47/49/51/52/55/56	40 m/min	+/- 5 mm	60 mm/s
KRS 47/49/51/52/55/56	80 m/min	+/- 6 mm	80 mm/s
KRS 51/52/55/56	120 m/min	+/- 8 mm	100 mm/s
KRS 52/55/56	180 m/min	+/- 10 mm	150 mm/s

Suggested optimisation values

- Optimise the controller by changing the values of parameter 13 and 16 in small steps.

### - **Parameter 13 Proportional range**

Use the proportional range parameter to indirectly determine amplification and in turn, sensitivity. The smaller the set proportional range, the greater the controller sensitivity will be.

We recommend that you decrease the proportional range in small steps. Decrease it until the web begins to oscillate, then increase it again until no overshooting may be detected.

Given a large degree of overshooting or unsatisfactory results, the actuating speed must also be changed.

- **Parameter 16** Actuating speed in automatic mode

Use this parameter to set the maximum actuator speed in automatic mode. The actuating speed may be set within a range of 1 mm/sec to 130 mm/sec (controller type 0, 2) or 1 mm/sec to 180 mm/sec (controller 1, 3).

|| If the actuating speed is too high or the controller proportional range set too small, the controller will start to oscillate.

|| **Controller DC 5506: see also section 5.11.**

→ Select manual mode.

→ Check the actuating speed in manual mode in parameter 18 and set if necessary. The actuating speed in manual mode is independent of the actuating speed in automatic mode.

### 7.3 Optimizing the motor current (actuator dynamics and actuating force)

Via parameter 49 "overdrive factor" a motor current and thus actuator dynamics increase may be set. The maximum motor current may be raised by factor 1 to 2, at the most however to 12 A per motor output.

Basic setting: 1.5.

If the dynamics seem to high the value may be reduced.

|| So as not to exceed the permissible input power in controller DC 5501, this action may only be performed in the lower and medium speed range.

Parameter 37 "max. rot. speed" is used to limit the output power and thus the input power.

Default setting from software version ZC 5501-....**ZE onwards:**

1250 rpm for controller type 0 and 1

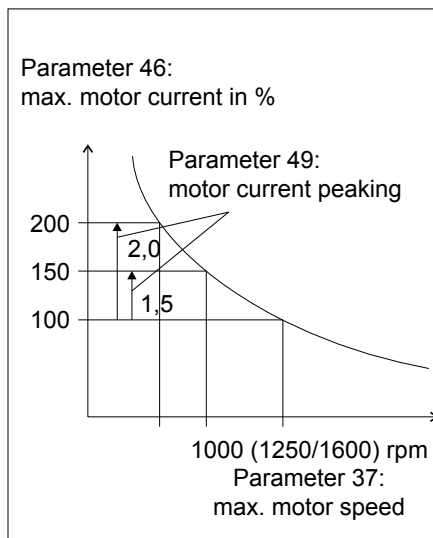
1600 rpm for controller type 2 and 3

Default setting for software version ZC 5501-....**ZA**

to ZC 5501-....**ZD:** 1000 rpm.

If a lesser actuating speed is selected than the possible  $V_E$  max ( $< 60\% V_E$  max), the value of parameter 37 may be increased. As such the motor current and thus the actuating force in the lower speed range may be increased **more steeply**.

If a too high setting of parameters 37 causes the intermediate circuit control to switch off due to overcurrent (error 11), especially when reversing the actuators, the value of parameter 37 must be reduced.



## 7.4 Calibrating the current symmetry on the motor outputs

The current symmetry is works calibrated.

Unbalanced motor currents may lead to an overload in the intermediate circuit control and thus to its switching off during power peaks (error 11).

- If error 11 occurs, check the current on both motors with an amperemeter or similar for symmetry.
- || For this purpose the motors must not be taxed (no web).
- If there is a deviation of >15 % between right/left-running in manual mode, recalibrate the current symmetry.
- || Call up the appropriate function in parameter 3 "start service" to calibrate the current symmetry whereby the system must be set to "Automatic OFF" (manual mode). Both motors must be at a standstill and untaxed.
- Select parameter 3. Set parameter value to 20 and change parameter to 2 or 4. The motor mounted on the right in the web direction of travel is calibrated.
- Select parameter 3. Set parameter value to 21 and change parameter to 2 or 4. The motor mounted on the left in the web direction of travel is calibrated.
- Select parameter 3. Set parameter value to 22 and change parameter to 2 or 4. The calibration data are saved.

## 8. Error messages

**!** Errors occurring on tender guider infeeds should only be cleared when they are switched off and the web is stationary.  
**Risk of injury.**  
**Please observe the locally applicable and professional safety regulations.**

### 8.1 System errors

Error:	24
	Sensor right fault

Error message: exaple error 24

Current system errors are indicated on the digital controller LCD display by an error code and brief description. The error message is displayed until the system error is cleared.

In the event of serious errors on tender guider infeeds with **one** digital controller DC 55.. (KRS 47/51/52) both actuators are blocked. On tender infeeds with **two** DC 55 digital controllers (KRS 49/55/56) only the actuator with the defective digital controller is blocked. See error table in section 8.2.

|| The actuators remain blocked until the system error is cleared, afterwards they are enabled automatically. The "operational" digital output is also deactivated during this period (high resistance).

## 8.2 Error table

Ready out:	the "Ready" output (X4.9) is de-energised
Controller power off:	the power relay in the controller remains switched off. The LCD display is in operation. Errors are displayed.
Motor output off:	the power relay is switched on, the motor switched off.
Controller blocked:	the power relay is switched on, the motor blocked (with static torque).
Warning:	a warning is output. The "Automatic" display in command station NT 5112 flashes.

Error code	Error type	Ready out	Controller Power off	Motor output off	Controller blocked	Warning	Error description Tips on clearing error
1	UAC power low	X	X				Input voltage on DC 55 too low --> Check mains voltage and if necessary adjust at the input side. --> Check supply lead from transformer, transformer controller connection lead.
2	UAC power high	X	X				Input voltage on DC 55 too high --> Check mains voltage and if necessary adjust transformer at the input side.
3	UDC intern low	X	X				Intermediate circuit voltage in DC 55 too low --> Check mains voltage and if necessary adjust transformer at the input side. --> Check supply lead from transformer, transformer controller connection lead.
4	UDC intern high	X	X				Intermediate circuit voltage in DC 55 too high --> Check mains voltage and if necessary adjust transformer at the input side. Braking power demanded too high.
5	UDC sec1 fault	X	X				Internal error --> Replace device.
6	UDC sec2 fault	X	X				Internal error --> Replace device.
7	24 V extern fault  Voltage on terminal X5.3 against X5.4	X		X			External operating voltage 24 V too low Overload or short circuit in 24 V mains system. --> Pinpoint cause, to do so measure voltage on terminal X5.3 against X5.4 and disconnect all 24 V terminals: X1.1-5-7 ; X3.1-4-9-10 ; X4.1-5-7 ; X6.1-4-9-10. Replace all connections one after the other and thus pinpoint cause.
8	24 V intern low  Voltage on terminal X5.1 against X5.2	X	X				Operating voltage 24 V too low Overload or short circuit in 24 V mains system. --> Pinpoint cause, to do so disconnect all 24 V terminals: X1.1-5-7 ; X3.1-4-9-10 ; X4.1-5-7 ; X6.1-4-9-10. Unplug sensor cable on X15 and X16. Replace all connections one after the other and thus pinpoint cause.
9	24 V intern high	X	X				Internal error --> Replace device.
10	Emergency loop open	X	X				--> Check emergency OFF circuit (power circuit X1.9 – X9.10) X1.9 24 V Ausgang, X9.10 input, relay current approx. 50 mA.

Error code	Error type	Ready out	Controller Power off	Motor output off	Controller blocked	Warning	Error description Tips on clearing error
11	I – intern fault	X		X			AC input current on terminals X2.1- X2.2 too high. - Input voltage too low. --> Check transformer voltage - Output power too high. --> Poss. reduce parameter 37. See section 7.6 Calibration of the current symmetry at the motor outputs. --> Motor current peaking Reduce parameter 49 overdrive factor. --> Reduce motor current parameter 46 current maximum.
12	Ready out fault	X					Short circuit on output terminal X4.9
13	Auto out fault	X	X				Short circuit on output terminal X3.10 or X6.10
14	Fan out fault	X	X				Short circuit on output terminal X 19. --> Check fan plug, replace fan.
15	I motor right high	X		X			- Motor current at right motor output too high. --> Check controller type, correct as necessary - Short circuit on motor output. --> Check leads to motor. - Ground fault on motor output. --> Check leads to motor. --> Check motor for ground fault.
16	I motor left high	X		X			- Motor current at left motor output too high. --> As in 15
17	Temp case high	X		X		X	Heat sink temperature too high (>85 °C). Heat sink temperature too high due to an overload or increased ambient temperature. --> Check ambient temperature.
18	Temp motor right	X		X		X	Motor temperature too high (>85 °C). Motor temperature too high due to an overload. --> Check control circuit - sensors - guider - motor for vibrations. --> Increase proportional range and/or reduce actuating speed (see parameter list). --> Check motors - gear - rack for smooth action and play.
19	Temp motor left	X		X		X	Motor temperature too high (>85 °C). --> As in 18
20	Encoder right fault					X	No signal from encoder on right motor. The guider automatically switches over to armature voltage control. Speed controlling is preserved with some impairment to accuracy (speed loss when taxed) - Encoder cable not connected or defective. -> Check cable and connection according to wiring diagram.
21	Encoder left fault					X	No signal from encoder on left motor. --> As in 20

Error code	Error type	Ready out	Controller Power off	Motor output off	Controller blocked	Warning	Error description Tips on clearing error
22	Encoder right invers					X	Right motor encoder signals mixed up. Guider automatically switches over to armature voltage control. Speed controlling is preserved with some impairment to accuracy (speed loss when taxed) - Encoder signals do not match motor direction of rotation. --> Check cable and connection according to wiring diagram.
23	Encoder left invers					X	Left motor encoder signals mixed up. --> As in 22
24	Sensor right fault				X	X	Right sensor not logged in. - Sensor incorrectly addressed. --> Check sensor address - group - device - Sensor or sensor cable defective --> Check sensor and sensor cable
25	Sensor right fault				X	X	Left sensor not logged in. --> As in 24
26	Gearconstant fault				X	X	Gear constant outwith permissible range. Actuating speed does not match setting (parameter 28). - Parameter 29 or 30 or 31 incorrect. --> Check and correct parameter. Set default values on KR 51/52/56 (see parameter list). On KR 47 determine and set gear constant (parameter 30), set spindle pitch (parameter 31) and set the default value in parameter 29.
27	Power off	X	X				Error code serves for internal saving of data. Is not displayed and saved
28	Temp motor right fault					X	Temperature signal from left motor or voltage supply for encoder missing. - Encoder - guider line interrupted. --> Check cable and connection according to wiring diagram. --> Check 24 V on terminal X6.9 (see error 7).
29	Temp motor left fault					X	Temperature signal from left motor or voltage supply for encoder missing. - Encoder - guider line interrupted. --> Check cable and connection according to wiring diagram. --> Check 24 V on terminal X3.9 (see error 7).
30	Motorline right fault	X					No current flow on right motor output: - Line to motor interrupted. --> Check line to motor according to wiring diagram - Brushes in motor defective. --> Check brushes
31	Motorline left fault	X					No current flow on left motor output. --> As in 30



### 8.3 Error memory

< ± time:	- 200 H
nr. 0	err. 24

Error display: example error 24

The last 100 system errors in each case are stored together with the operating time. They may be retrieved at any time.

→ Select "time,nr.,err." in the setup editor menu.

Call up the required error via the cursor keys  . The most recent error to arise is assigned number 0, the penultimate the number 1 etc., the oldest error the number 99. In the "time" field the difference to the actual operating time is displayed, i.e. how many hours ago the error occurred. The error code is indicated in the "err." field, see section 8.2 error table for explanations.

## 9. Maintenance

**! Maintenance work may only be performed when the tender is switched off.**

Maintenance for the actuator, spreading device and sensor etc. is specified in the relevant component descriptions.

### 9.1 Conversion actuator KR 51 to actuator KR 52/56

Actuator KR 52 replaces actuator KR 51 in KRS 51 tender guider in-feeds.

|| KR 52 actuators may only be implemented and replaced in pairs.

Actuator KR 56 replaces actuator KR 51 in KRS 55 tender guider in-feeds.

After actuator replacement the following settings must be performed:

- Please observe safety measures, see chapter 5.1.
- Set controller type, see chapter 5.3.
- Check parameters, see chapter 5.4
- Check positioning direction of motors, see chapter 5.8.1.

### 9.2 Conversion controller DC 5500/5505 to controller DC 5501/5506

Digital controller DC 5501/5506 replaces digital controller DC 5500/5505.

|| The digital controller must be replaced completely, including side cover with connections for sensors and CAN bus.

Following replacement the tender guider infeed must be recommissioned.

→ See "Commissioning" chapter.

## 10. Technical data

The technical data for the actuator, sensor, selvedge opener etc. are specified in the relevant component descriptions.

### 10.1 Tender guider in-feed KRS 47/51/52

#### Power unit/Transformer

Supply voltage	110 to 600 V AC
Nominal rating	680 VA
Nominal voltage	34 V AC
Output current	20 A AC

#### Controller/Amplifier DC 55..

Supply voltage	34 V AC
Power input	550 VA
Power output (*T <sub>U</sub> < 45 °C)	2 x 225 W
Output current	2 x 8 A
Permissible ambient temperature	60 °C
Protection class	
Controller DC 55..	IP 20
Switch panel SE 405.	IP 20
Controller DC 55.. in E+L control cabinet	IP 54

#### Actuator KR 47 with DC 55..

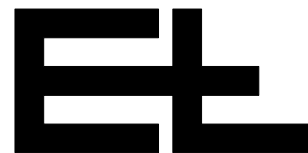
Permissible ambient temperature	65 °C
Protection class KR 47	IP 54
Nominal speed	160 <sup>1</sup> /min
Nominal torque	8.5 Nm
Gear transmission ratio i	7.25

#### Actuator KR 51 with DC 55..

Permissible ambient temperature	65 °C
Protection class KR 51	IP 54
Nominal adjustment speed	120 mm/sec
Nominal actuating force	1120 N

#### Actuator KR 52 with DC 55..

Permissible ambient temperature	65 °C
Protection class KR 51	IP 54
Nominal adjustment speed	120 mm/sec
Nominal actuating force	1230 N



## 10.2 Tenter guider infeed KRS 49/55/56

### Power unit/Transformator

Supply voltage	110 to 600 V AC
Nominal rating	680 VA
Nominal voltage	34 V AC
Output current	20 A AC

### Controller/Amplifier DC 55..

Supply voltage	34 V AC
Power input	640 VA
Power output (*T <sub>U</sub> < 45 °C)	520 W
Output current	12 A (max. 16 A)
Permissible ambient temperature	60 °C
Protection class	
Controller DC 55..	IP 20
Switch panel SE 405.	IP 20
Controller DC 55.. in E+L control cabinet	IP 54

### Actuator KR 47 with DC 55..

Permissible ambient temperature	65 °C
Protection class KR 47	IP 54
Nominal speed	240 <sup>1</sup> /min
Nominal torque (*T <sub>U</sub> 40 °C)	13 Nm
Gear transmission ratio i	7.25

### Actuator KR 51 with DC 55..

Permissible ambient temperature	65 °C
Protection class KR 51	IP 54
Nominal adjustment speed	180 mm/sec
Nominal actuating force (*T <sub>U</sub> 40 °C)	1700 N

### Actuator KR 56 with DC 55..

Permissible ambient temperature	65 °C
Protection class KR 51	IP 54
Nominal adjustment speed	180 mm/sec
Nominal actuating force (*T <sub>U</sub> 40 °C)	1870 N

**Technical data subject to modification without notice**